

J. Perinat. Med.
1 (1973) 60

Prognostic significance of abnormal ultrasonographic findings during the second trimester of gestation

Michael S. Ramzin, Rudolf O. Meudt, Malte J. Hinselmann

Department of Gynecology and Obstetrics, University of Basel, Switzerland
(Chairman: Prof. Dr. O. Käser)

Received September 4, 1972. Accepted September 29, 1972.

While dealing with the **problem of congenital cardiac malformations in perinatology**, we noted that the intrauterine cephalometric measurements in infants with transposition of the great vessels, observed during the second trimester of pregnancy, were abnormal [4]. It was assumed that at this time of gestation, pathology was more likely caused by reduced potential of fetal growth rather than by placental insufficiency [1]. This finding lead us to conduct a **retrospective study of the cases with pathological cephalometry in the mid-trimester** and to evaluate the meaning as well as the prognostic significance of abnormal fetal development prior to the 28th week of gestation.

1. Methods and material

The routine examination was carried out using the echoscopic (Vidoson 635, B-scan, SIEMENS, W. Germany) and ultrasonographic (A- and B- transverse scan, KRETZ 4100, Austria) methods [3]. The evaluation of the fetal biparietal diameter was done with reference to our standard curve (fig. 1) of intrauterine fetal biparietal growth (SIUBG [2]). The 1500 analyzed cases (more than 5000 ultrasonic explorations) consisted of 1336 (89%) cases with normal

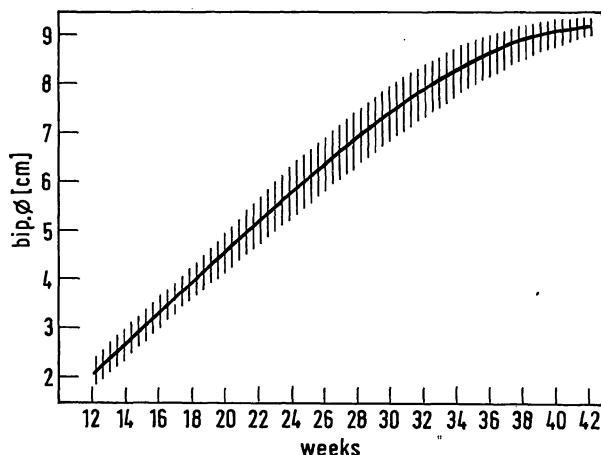


Fig. 1. Our standard curve of biparietal diameter growth during pregnancy (12th—42nd week of gestation).

Curriculum vitae

MICHAEL S. RAMZIN was born in 1938 in Belgrade, Yugoslavia, the son of a physician. His high school education and medical studies were completed in Belgrade.

From 1964—1966 he was employed in the clinics of the University of Belgrade; from 1967—1969 he worked in the unit for intensive care of newborn infants Department of Obstetrics and Gynecology, University of Basel, Switzerland, (Chairman: Prof. Dr. Th. Koller).

During the years 1969—1972 he specialised in obstetrics and gynecology in the Department of Obstetrics and Gynecology, University of Basel, (Chairman: Prof. Dr. O. Käser).

His main fields of interest are the surveillance of the intrauterine fetus and the newborn infant immediately after birth.



cephalometry and 164 (11%) with pathological measurements. In 69 cases (4.6%) with abnormal biparietal measurements, it was necessary to readjust the estimated gestational age, while the remaining 95 cases (6.9%) were considered for further analysis. From the 95, 61 cases were below and 34 cases above our SIUBG.

2. Results

2.1 Cases with measurements below SIUBG (tab. 1)

20 (33%)	Small-for-date infants (under 10 percentiles according to THOMSON)
10 (17%)	Fetuses died before the 28th week of gestation
8 (18%)	imminent abortion (pathological placentation)
7 (11%)	Malformations
p < 0,01	
16 (26%)	Normal infants after normal pregnancies

Tab. 1. Abnormal cephalometry in the 2nd trimester of pregnancy below SIUBG (n = 61).

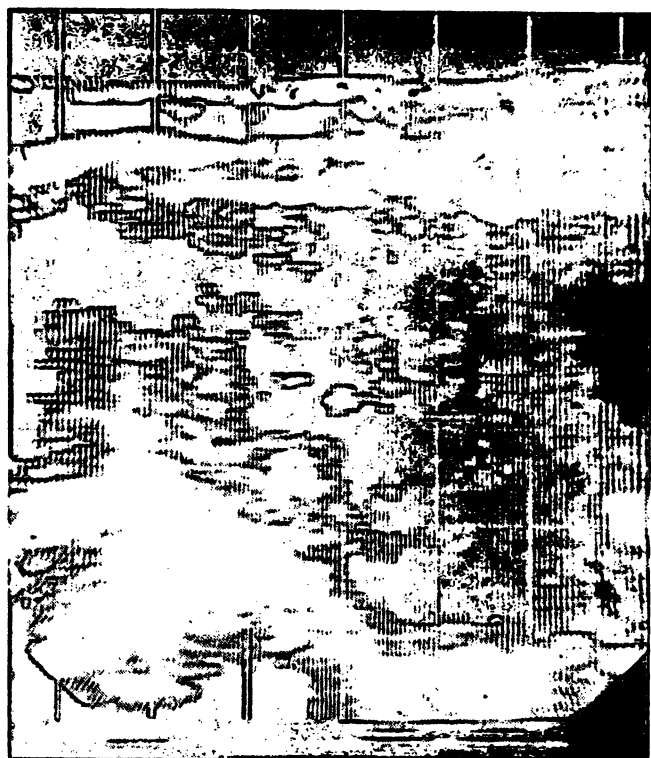


Fig. 2. Placenta praevia with retroplacental haematoma (16th week of pregnancy).

Twenty infants from the selected group of 61 were severely retarded (with birth weight under 10 percentiles according to THOMSON [6]). The retardation was found to have occurred prior to the 24th week of gestation and was probably due to reduced fetal growth potential.

Ten infants died before the beginning of the 28th week of gestation. A study of the case history of these patients revealed infertility in 6 cases. In 8 cases, the pregnancy was disturbed by faulty placentation, causing retroplacental hemorrhages, as confirmed by ultrasonic exploration. One of those cases is shown in fig. 2. Seven infants were malformed and in 16 cases pregnancy proceeded normally with healthy newborns.

Statistical analysis showed that the rate of fetal pathology had increased significantly ($p < 0.01$) in cases with early retarded biparietal growth (tab. 1).

2.2 Cases with measurements above SIUBG (tab. 2)

Among the infants with biparietal diameters above our SIUBG in the mid-trimester we found:

13 (38%)	Large-for-date infants (over 90 percentiles according to THOMSON)
6 (17%)	Malformations
$p > 0,05$	
15 (45%)	Normal infants after normal pregnancies

Tab. 2. Abnormal cephalometry in the 2nd trimester of pregnancy above SIUBG ($n = 34$).

In 13 cases, **large-for-date infants** (with birth weight over 90 percentiles according to THOMSON [6]). From this group, in 6 cases we diagnosed a pathologic carbohydrate metabolism in the mother. **Six infants were malformed** and 15 babies were normal after an uneventful pregnancy. Fetal pathology had not statistically increased when biparietal diameter was above our SIUBG.

2.3 Fetal malformations (tab. 3)

In our series of 1500 cases we found 24 infants with congenital malformations [5]. In 13 of these cases, the biparietal diameter was found to be abnormal. The distribution of cases with biparietal diameters above and below our standard

Abnormal cephalometry ($n = 13$)	below SIUBG ($n = 7$)	Transposition of the great vessels (twice)
		Anencephalus
		Diaphragmatic hernia
		POTTER syndrome
		Multiple skeletal malformations
		Partial aplasia of the thyroid
	above SIUBG ($n = 6$)	Multiple malformations (twice)
		Hydrocephalus
		Diaphragmatic hernia
Pathologic transverse scan ($n = 2$)		Meningomyelocele
		Ventricular septal defect
		Cranium bifidum
Normal ultrasonic findings ($n = 9$)		Sacroccygeal teratoma
		Down's syndrome (7 cases)
		Tetralogy of FALLOT
		Cor triloculare biatriatum

Tab. 3. Fetal malformations ($n = 24$).



Fig. 3. Sacro-coccygeal teratoma in the 26th week of pregnancy.

Fig. 3a. The same case after delivery.



Fig. 4. Caput bifidum (15th week of gestation).

Fig. 4a. The same case after delivery.



curve was about equal. Two children had normal biparietal diameters but a pathological transverse scan (figs. 3 and 4a): Cranium bifidum, sacrococcygeal teratoma.

Down's syndrome appeared 7 times among the 9 malformed infants with normal mid-trimester cephalometry and transverse scan. The ultrasonic exploration could not predict the outcome of these cases, although usually fetal malformation could be recognized by or suspected from the often accompanying hydramnios. In our series Down's Syndrome was diagnosed after delivery.

Among the cases with normal ultrasonic findings we also found one infant with cor trilioculare, biatriatum and one with a tetralogy of FALLOT

3. Comment

The probability that the infant will be malformed if its biparietal diameter is abnormal during the 2nd trimester of gestation was in our material 13.5% (13 out of 95 cases). The rate of fetal malformation in cases with normal biparietal diameters was only 0.06%. (9 out of 1405 cases). The difference is statistically highly significant ($p < 0.001$) (tab. 4).

Abnormal cephalometry (n = 95)	*13.6 %	(13/95)
Normal cephalometry (n = 1405)	0.06%	(9/1405)
		p < 0.001

Tab. 4. Probability quotient — fetal malformation (2nd trimester); * exact limits of confidence 7.5%—22.3%.

Summary

More than 5000 routine ultrasonic explorations were carried out on 1500 patients during the mid-trimester of pregnancy. The combined methods of echoscopy and ultrasonography were employed. The retrospective study revealed that in 89% (n = 1336) of the cases the biparietal diameter of the fetal head was within normal limits with reference to our standard curve (fig. 1) of intrauterine fetal biparietal growth (SIUBG).

In 11% of the cases (n = 164) the biparietal diameter was found to be abnormal. Of this group, the estimated gestational age had to be readjusted in 69 cases (4.6%) and the remaining 95 cases (6.4%) were suitable for further analysis.

The biparietal diameter during the mid-trimester was below SIUBG in 61 cases and above the standard curve in 34 cases. This group (n = 95) of abnormal cephalometry according to our SIUBG during the 2nd trimester revealed (tabs. 1 and 2): In 35% (n = 33) of the cases a pathological growth potential (exact limits of confidence 20—45%), in 13.5% (n = 13) malformation of the infants (exact limits of confidence 7.0—23%), in 10.5% (n = 10) in-

trauterine death prior to the 28th week of gestation (exact limits of confidence 5%—18%), in 8% (n = 8) a pathological placentation (exact limits of confidence 4%—16%) (fig. 2) and in only 33% (n = 31) normal infants after uneventful pregnancy (exact limits of confidence 23%—46%).

The probability that the infant will be malformed if its biparietal diameter is below or above our SIUBG was found to be 13 out of 95 cases (13.6% — exact limits of confidence: 7.5%—22.3%). In the cases with normal biparietal diameter (according to SIUBG) the malformation quotient was only 0.06% (tab. 4).

Among 24 infants born with congenital malformations (tab. 3) 15 had pathological ultrasonic findings during the mid-trimester. However, two of the 15 cases with normal biparietal growth showed abnormal transverse scan (figs. 3 and 4a).

A normal cephalometry and normal transverse scan were obtained during the 2nd trimester in the 7 newborn infants with Down's Syndrome (mongolism) and in 2 infants born with congenital heart malformations.

Keywords: Fetus, growth, malformations, placenta, midtrimester, echoscopy, ultrasonography, cephalometry, scan.

Zusammenfassung

Prognostische Bedeutung abnormer Ultraschall-Befunde im 2. Schwangerschaftsdrittel

Die ultraschalldiagnostische Untersuchung im 2. Schwangerschaftsdrittel wird bei uns routinemäßig unter Verwendung einer kombinierten echoskopisch-ultrasonographischen Methode durchgeführt. Bei 1500 Fällen mit mehr als 5000 Untersuchungen wurde eine retrospektive Analyse durchgeführt. Diese Analyse zeigte, daß in 89% der Fälle (n = 1336) die Meßwerte des biparietalen Durch-

messers in den Normbereich unserer Wachstumskurve (SIUBG) fielen (Abb. 1). Bei 4,6% der Fälle konnten abnorme Maße durch ein falsches Gestationsalter erklärt werden. Die restlichen 6,4% der Fälle (n = 95) wurden einer genaueren Betrachtung unterzogen.

Von den 95 Fällen mit abnormer Kephalmetrie (61 unter und 34 über SIUBG) im 2. Schwangerschaftsdrittel zeigten (Tab. 1, 2): 35% n = 33 ein abnormes Wachstumspotential (genaue Vertrauensgrenzen 25%—45%), 13,5%

($n = 13$) Mißbildungen bei der Geburt (genaue Vertrauensgrenzen 7,5%—23%), 10,5% ($n = 10$) nachfolgenden intrauterinen Fruchttod vor Abschluß der 28. Schwangerschaftswoche (genaue Vertrauensgrenzen 5% bis 18%), 8% ($n = 8$) eine gestörte Plazentation (genaue Vertrauensgrenzen 4%—16%) (Abb. 2) und lediglich 33% ($n = 31$) ein normales Kind bei der Geburt nach unauffälligem Schwangerschaftsverlauf (genaue Vertrauensgrenzen 23%—64%).

Die Wahrscheinlichkeit, daß ein Fötus mit abnormem Kephalometriemaß im 2. Schwangerschaftsdrittel mißgebildet ist, beträgt 13/95 (13,6%) mit den genauen Vertrauensgrenzen von 7,5%—22,3%, während bei nor-

malen Maß die Wahrscheinlichkeit bei 0,06% liegt (Tab. 4).

Abnorme Ultraschallbefunde im 2. Schwangerschaftsdrittel sprechen gegenüber normalen Befunden hochsignifikant häufiger für einen pathologischen Zustand des Kindes.

Ausgehend von den insgesamt 24 mißgebildeten Kindern in unserem Kollektiv (Tab. 3) zeigten 15 Fälle einen abnormen Ultraschallbefund im 2. Schwangerschaftsdrittel (2 davon allerdings bei normalem Wachstumsverlauf des biparietalen Durchmessers) (Abb. 3, 3a, 4, 4a). Hingegen wiesen 7 Neugeborene mit Down's Syndrom (Mongolismus) und 2 mit Herzmißbildungen keine abnormen Ultraschallbefunde in diesem Schwangerschaftsabschnitt auf.

Schlüsselwörter: Fetus, Wachstum, Mißbildungen, Plazenta, 2. Schwangerschaftsdrittel, Ultraschall, Kephalometrie, Scan

Résumé

La valeur pronosticale des explorations ultrasono-diagnostiques anormales pendant le deuxième trimestre de la grossesse

L'exploration ultrasonodiagnostique au cours du second trimestre de la grossesse constitue dans notre service un examen de routine pratiqué à l'aide d'une méthode combinée échoscopique et ultrasonographique.

Ce travail présente une analyse rétrospective portant sur 1500 cas totalisant plus de 5000 examens ultrasoniques.

En conclusion de cette étude, il convient de relever les données suivantes: dans 89% des cas ($n = 1336$), la valeur du diamètre bipariétal est comprise dans les limites de la norme définie par la courbe standard (fig. 1) de croissance intra-utérine du diamètre bipariétal (SIUBG); dans 4,6% des cas, les mensurations sortant de la norme sont à mettre sur le compte d'une erreur concernant l'âge gestationnel.

Dans 6,4% des cas, soit chez 95 gestantes, les valeurs du diamètre bipariétal sont soit trop élevées (34 cas) soit en-dessous des limites de la norme (61 cas). Parmi ces 95 cas caractérisés par un diamètre bipariétal anormal (tabls. 1, 2): 35% ($n = 33$) présentaient un potentiel de croissance anormal (limites exactes de fiabilité 25%—45%), 13,5% ($n = 13$) étaient atteints d'une malformation à la naissance (limite exacte de fiabilité 7,5%—23%), 10,5% ($n = 10$)

concernaient des morts intra-utérines survenues avant la 28ième semaine (limites exactes de fiabilité 5%—18%), 8% étaient en rapport avec des troubles de la placenta-tion (limites exactes de fiabilité 4%—16%) (fig. 2). Enfin dans 35% des cas ($n = 31$), il s'agissait de grossesses normales terminées par la naissance d'un enfant normal.

La probabilité qu'un fœtus présentant une céphalo-métrie anormale au cours du second trimestre de la grossesse soit atteint d'une malformation s'élève à 13,6%, soit dans notre étude 13 cas sur 95 (limites exactes de fiabilité 7,5%—22,3%). Par contre, lorsque la céphalo-métrie fournit des valeurs comprises dans les limites de la norme, cette probabilité n'est que de 0,06% (tab. 4).

Lorsque l'examen pratiqué au cours du second trimestre permet de mettre en évidence une anomalie ultrasonique quelconque, il faut s'attendre à un état pathologique de l'enfant statistiquement plus souvent que lorsque cet examen est sans particularité.

Parmi les 24 enfants malformés de notre collectif (tab. 3), 15 présentaient une anomalie ultrasonique lors de l'examen du second trimestre (dans 2 cas, la croissance du diamètre bipariétal était cependant normale (fig. 3, 3a, 4, 4a).

Par contre chez 7 nouveau-nés mongols ainsi que chez 2 enfants atteints d'une malformation cardiaque, aucune anomalie n'avait pu être décelée par cet examen.

Mots-clés: Foetus, malformation, placenta, exploration ultrasonodiagnostique, cephalométrie, second trimestre.

Bibliography

- [1] GRUNEWALD, P.: Growth of the human fetus. Amer. J. Obstet. Gynec. 94 (1966) 1112
- [2] HINSELMANN, M.: Ergebnisse und Deutung der intrauterinen Kephalometrie bei Messungen und Wachstumskontrollen mit Ultraschall ab 12. Schwangerschaftswoche. In: SALING, E., F. J. SCHULTE: Perinatale Medizin Band II. 3. Deutscher Kongreß für Perinatale Medizin, Berlin 1970. Thieme, Stuttgart 1972
- [3] HINSELMANN, M.: Ultraschalldiagnostik in der Geburtshilfe. Gynäkologe 2 (1969) 45
- [4] RAMZIN, M., H. RÜTTGERS, E. GULIK, M. HINSELMANN, F. KÜBLI: The perinatal aspects of fetal congenital heart malformations. In press
- [5] SCHAFER, A. J.: Diseases of the newborn. Saunders, Philadelphia-London 1971
- [6] THOMSON, A. R., W. Z. BILLEWICZ, F. E. HYTTEN: The assessment of fetal growth. J. Obstet. Gynaec. Brit. Cwlth. 75 (1968) 903

Dr. M. S. Ramzin

Department of Gynecology and Obstetrics University of Basel
Schanzenstraße 46, 4000 Basel/Switzerland

Holländer

Die Ultraschalldiagnostik in der Schwangerschaft

Von Priv.-Doz. Dr. med. Hans-Jürgen Holländer, Oberarzt der
Universitäts-Frauenklinik, Münster (Westf.).

Geleitwort von Prof. Dr. med. G. Reiffenstuhl, Direktor der Uni-
versitäts-Frauenklinik, Münster.

1972. VIII, 181 Seiten. 112 Abbildungen. Gebunden DM 58,—
ISBN 3-541-05671-1

Die Ultraschalldiagnostik hat in den letzten Jahren auf dem Ge-
biet der Gynäkologie und Geburtshilfe zunehmend an Bedeutung
gewonnen.

In dem Buch werden das Prinzip dieses neuen diagnostischen Ver-
fahrens sowie die physikalischen Wirkungen des Ultraschalls be-
sprochen. Es folgt ein Überblick über die historische Entwicklung.
Aufgrund seiner umfangreichen eigenen Erfahrungen erläutert der
Autor die Möglichkeiten und Grenzen der Ultraschalldiagnostik
unter Berücksichtigung des Ultraschall-Schnittbildverfahrens.

Die Ultraschalldiagnostik gestattet eine frühe Feststellung der
Schwangerschaft selbst, eine Kontrolle der Entwicklung der Frucht,
eine baldige Diagnostik einer Blasemole und einer Zwillings-
schwangerschaft. Besonders dient sie der Überwachung von Risi-
koschwangerschaften. Typische Wachstumsstörungen lassen auf
eine chronische Insuffizienz der Plazenta oder auf einen Diabetes
der Mutter schließen. Weitere Aufschlüsse erhält man bei Rhe-
susinkompatibilität, über den Sitz der Plazenta vor einer Frucht-
wasserpunktion, auch über eine schwere Erythroblastose. Ein
intrauteriner Fruchttod kann schnell und zuverlässig nachgewie-
sen werden, manchmal auch grobe Fehlbildungen der Frucht.

Durch eine umfassende Information wird jedem interessierten Arzt
eine gute Grundlage für die praktische Anwendung der Ultra-
schalldiagnostik in der Schwangerschaft geboten.

Zu beziehen durch Ihre Buchhandlung.

**Urban &
Schwarzenberg
Verlag für
Medizin
und Natur-
wissenschaften**

Aspects and Treatment of Vulvar Cancer

1st Int. Symp. on Vulvar Cancer, Madrid, March 1971

L. López de la Osa Garcés
(Madrid)

X + 206 p., 32 fig., 79 tab.,
1972

SFr. 75.—/ US \$ 21.00 /

DM 68.—/ £ 8.25

ISBN 3-8055-1399-2

Precancerous Lesions of the Vulva — Etiology and Pathogeny of Carcinoma of the Vulva — Anatomic Pathology of Vulvar Cancer — Bowen's and Paget's Diseases of the Vulva — The Histopathology and Degree of Malignancy in Invasive Carcinoma of the Vulva — Electron Microscopy of the Vulvar Epithelioma — The Patient Problem. Carcinoma of the Vulva — The Classification of Malignant Tumors of the Vulva — The Biology of Epidermoid Carcinoma of the Vulva and its Implications for Treatment — Clinical and Anatomical Bases for the Treatment of Vulvar Cancer — Melanoma of the

Vulva: Five Cases — Clinical Aspects and Treatment of Carcinoma of the Vulva — A Clinical Study of Vulvar Carcinoma — General Principles of Oncological Plastic Surgery and their Application to the Treatment of Cancer of the Vulva — Surgical Treatment of Invasive Carcinoma of the Vulva — A Critical Assessment of Lymphadenectomy in Radical Vulvectomy — Treatment of Vulvar Pathology — Radiotherapy of the Vulvar Carcinoma — The Evolution of the Vulvar Carcinoma in Relation to the Different Treatments Administered in the National Cancer Institute — The Technique of Surgical Treatment for Cancer of the Vulva and its Five-Year Results — Diagnosis, Prophylaxis and Management of Vulvar Cancer — Naevus-Carcinoma of the Vulva — Conclusion of the Symposium

This volume is concerned with the clinical treatment of vulvar carcinoma, minutely analysing the different techniques of early diagnosis of lesion and the prognostic value according to the histological characteristics of the illness. The various clinical classifications are presented followed by a critical study. Included are a description of the anatomical basis of surgical treatment and a definition of the role of actinotherapy in vulvar carcinoma. The surgical techniques are explained clearly and in detail by various authors and evidence is produced demonstrating the utility of the plastic surgeon as a collaborator in order to repair the large resections necessary in some cases. The book offers gynecologists a clear picture of the present situation of malign vulvar pathology.

S.Karger



Basel · München · Paris · London · New York · Sydney

K560